CONFIDENTIAL

ENVIRONMENTAL COMPLIANCE ASSESSMENT

DRAFT REPORT

VOLUME 1 of 3

CEDAR CHEMICAL CORPORATION
VICKSBURG, MISSISSIPPI

prepared for
Cedar Chemical Corporation
Memphis, Tennessee

prepared by

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EXECUTIVE SUMMARY

In general, the Cedar Chemical Corporation manufacturing facility in Vicksburg, Mississippi is presently being managed in accordance with existing environmental regulations. Key issues are as follows:

Hazardous Substances

- It would be advisable to construct secondary containment structures around the undiked chemical tanks in both the north and south plants to minimize the possibility of further site contamination due to leaks, spills, or catastrophic events.

Air

- Excessive particulate emissions are released by the material handling units in the potassium nitrate plant. Several possible means of reduction are described in the facility's recently prepared Waste Minimization Plan. These suggestions should be evaluated and implemented to both reduce airborne emissions and reduce product losses.

- The 1990 Clean Air Act Amendments may have a significant impact upon the facility operations, primarily due to the presence of specific Hazardous Air Pollutants (primarily chlorine). Care should be taken to ensure compliance with these new requirements.

Water

- The facility is subject to the stormwater permitting requirements recently promulgated by the U.S. Environmental Protection Agency. The product losses in the potassium nitrate plant along with the quantities of surface contamination present in the nitric acid plant areas may cause difficulties in compliance with the permit upon issuance.

Solid and Hazardous Waste

- The facility appears to be handling current hazardous wastes in the proper manner. However, past practices have resulted in extensive surface, subsurface, and groundwater contamination which are being addressed under RCRA. Thirty-four Solid Waste Management Units (SWMUs) have been identified, of which 26 require further investigation. The SWMUs requiring further investigation include a landfilling areas, productions areas, a chemical crypt, and many other areas where evidence of pesticide contamination exists. A consent decree is in the process of being approved which will require a RCRA Facility Investigation with the subsequent corrective measures. Additional legal or regulatory action may also be enacted by the Mississippi Department of Natural Resources.

- The facility has recently prepared a Waste Minimization Plan. The waste reduction strategies in this plan should be examined and implemented, if practical, in order to reduce waste quantities, reduce air emissions, improve stormwater contaminant levels, and reduce product losses.

Releases and Contamination

- As stated above, an extensive amount of surface contamination is present at this facility, including the pesticides dinoseb and toxaphene. Arsenic contamination has also been detected. In addition, 17 groundwater monitoring wells are located at the facility; the majority of these wells have displayed measureable levels of various contaminants, including dinoseb and toxaphene. It is likely that the RCRA activities described above will require significant remedial activities at this site.

- The lined ponds within the south plant surface impoundment are leaking. The leachate collection system is currently being used to collect water from beneath the liner for reinjection into the ponds. The liner leaks should be corrected when possible.

INTRODUCTION

Environmental and Safety Designs, Incorporated was retained by Cedar Chemical Corporation to conduct an environmental compliance assessment of the Cedar Chemical Corporation facility in Vicksburg, Mississippi. The compliance assessment was conducted by interviewing key personnel, reviewing pertinent documents, and visually inspecting relevant plant components. The site visit was performed on March 26-27, 1992 by Robert Maddux of Environmental and Safety Designs, Incorporated (EnSafe). Additional information had been obtained earlier during preparation of the facility's Waste Minimization Plan.

After the site visit, appropriate federal, state, and local regulatory agencies are contacted by visit or phone to determine if the facility and its waste transporter, treatment, and disposal facilities are in compliance with environmental regulations. Special effort is made to determine whether the facility may have incurred any significant environmental liabilities, either through its own actions, the actions of previous owners, or the actions of any current or past waste service companies used by the facility. Often this information may be requested under the Freedom of Information Act. If so, it may take several weeks to receive the information.

Based on site geography, materials handling practices, and visual observations, soil and groundwater sampling and analysis may be required to better define site contamination. If this is required, a Phase II assessment will be recommended. The analyses required in a Phase II assessment may not be available for several weeks after the original visit.

This report describes the pertinent information obtained. It is important to note that, while significant problems may not have been found, it is possible that undiscovered information may or may not show that the facility has significant liabilities. These liabilities may include such items as being a potentially responsible party (PRP) to a CERCLA (Superfund) cleanup (holding facility owners and/or operators liable for a significant monetary amount), being in jeopardy of losing a permit or license which allows the facility to remain in operation, or requiring the allocation of significant sums of money to bring the facility into compliance with environmental regulations.

The following report is based upon information from regulatory and private outside sources. The accuracy of information obtained from these sources cannot be affirmed by EnSafe. The report represents a prudent and reasonable evaluation of the facility's compliance with environmental regulations. EnSafe assumes no responsibility for conditions that are not currently recognized by regulatory authorities as environmentally unacceptable.

DISCUSSION

1.0 FACILITY DESCRIPTION

1.1 General Information

Name: Cedar Chemical Corporation

Address: P.O. Box 821003
Rifle Range Road
Vicksburg, Mississippi 39182

Telephone: (601) 636-1231

Contacts: John H. Miles, Jr., Plant Manager
Steven Boswell, Director of Environmental Affairs
David Keen, Environmental Specialist
Otto Logue, Health, Safety, and Training Officer

EPA Identification Number: MSD 990 714 081

SIC Codes: 2812 - Alkalies and Chlorine
2819 - Industrial Inorganic Chemicals, Not Elsewhere Classified
2873 - Nitrogenous Fertilizers

The Vicksburg facility of the Cedar Chemical Corporation is located on Rifle Range Road, Stouts Crossing, in Vicksburg, Mississippi. The site consists of approximately 650 acres, including approximately 130 acres used for production activities. The remainder of the site is primarily wooded.

The facility is located southwest of Vicksburg, with the majority of the land area located between U.S. Highway 61 and U.S. Business Highway 61. The northwest point of the property extends to the Mississippi River bank. The industrial areas of the property are located along the Illinois Central Railroad, and are bounded on the east by Stout's Bayou and on the south by Hennessey's Bayou. The property is bounded by light industrial areas on the south, light residential areas on the north to southwest, and rural areas on the northeast to the south.

The facility is approximately one quarter of a mile from the closest residence, and 3 miles from the nearest densely populated area. However, a school is located within a one-mile radius of the facility, and a hospital within a two mile radius.

The plant site is comprised of two distinct areas, which are designated as the north plant and the south plant. Various product manufacturing activities occur in each plant. A plot plan of the property is shown Figure 1-1. Plot plans of the two individual plants are shown in Figures 1-2 and 1-3.

The facility has existed for approximately 38 years. Prior to development, the site was reportedly used as cultivated farm land. The present production plant originated as two separate facilities. The south plant began operation in 1954 as the Spencer Chemical Company. In 1964, it was purchased by the Gulf Oil Company. The north plant was established in 1961 by American Metal Climax Corporation, also referred to as Southwest Potash. In 1972, the two plants were purchased and merged by the Vicksburg Chemical Company, which then became a part of the Vertac Chemical Corporation in 1975. Vertac was taken over by its holding company, Dyticon, Inc., in 1978. The facility became known as Cedar Chemical Corporation, a sister company to Vertac, in 1986, as part of a structural reorganization of the company. This reorganization was conducted in conjunction with the purchase of the company from Dyticon by Fermenta A.B. of Sweden in 1986. Portions of the company, including the Vicksburg facility, were purchased in 1988 by the Nine West Corporation, a subsidiary of Trans Resources.

A small area within the south plant in not owned by the Cedar Chemical Corporation; it is owned by Borden Chemical (earlier owners included Gulf Oil and the Perkins Company) and produces formaldehyde.

1.2 Operations

Cedar Chemical Corporation currently manufactures various grades of fertilizers and inorganic chemicals. The north plant produces potassium nitrate, chlorine, and nitrogen tetroxide, while the south plant produces nitric acid, much of which is used in the north plant fertilizer operation, and inhibited red fuming nitric acid. Operations occur 24 hours per day, seven days per week.

In the past, the facility produced a wide variety of pesticides and inorganic chemicals. The south plant originally produced nitric acid, ammonia, urea, unspecified fertilizers, and ammonium nitrate. The main products from the original north plant were potassium nitrate and chlorine. Production of the pesticides dinoseb, atrazine, and toxaphene began in the south plant in 1973. Production of atrazine was discontinued in 1979, toxaphene in 1982, and dinoseb in 1986. Methyl parathion was produced at the south plant until 1978. Also, short batch

Insert Figure 1-1 Property Plot Plan

Insert Figure 1-2 Nitric Acid Plant Plot Plan

Insert Figure 1-3 Potassium Nitrate Plant Plot Plan operations were conducted in the 1970s and 1980s for the production of diethylhexyl phosphoric acid and 2-ethyl-hexyl nitrate. Other products known to have been produced in the south plant include arsenic herbicide monosodium methanearsonate, disodium methanearsonate, sodium cacodylate, dimethylurea, dinitro-ortho-cresol, Cyanizine, 1-hydroxy-ethilidene-1,1-diphosphoric acid (UNIHIB), unsymmetrical dimethyl hydrazine (experimental process), and the intermediates sulfonated ortho-sec-butyl phenol and diethylhexyl phosphochloridate. Raw materials for these processes included chlorine, camphene, ortho secondary butyl phenol (OSBP), arsenic trioxide, sodium hydroxide, methyl chloride, and sulfuric acid.

1.3 Processes

The Cedar Chemical Company facility is divided into two primary areas. The south plant produces nitric acid and inhibited red fuming nitric acid, and the north plant produces potassium nitrate, chlorine, and nitrogen tetroxide. The nitric acid plant operates at a rate of 250 tons per day. The potassium nitrate plant operates at a rate of approximately 16.7 tons per hour. The following sections detail the production processes, the wastes generated, and the present means of treatment or disposal of the wastes.

Nitric Acid Production

The southern portion of the Cedar Chemical plant produces nitric acid. The nitric acid plant is a 250-ton per day plant which meets New Source Performance Standards. The nitric acid product is utilized in the north plant to produce potassium nitrate fertilizer and nitrogen tetroxide.

Nitric acid (HNO_3) is a strong mineral acid which, when combined with metals or alkalies, forms nitrates. Basically, it is manufactured by passing ammonia (NH_3) and air through a platinum gauze catalyst, where the ammonia burns to the oxide. Essential equations for the reactions are:

$$4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$$
$$2NO + O_2 \rightarrow 2NO_2$$
$$3NO_2 + H_2O \rightarrow 2HNO_3 + NO$$

A detailed process description is as follows:

Liquid ammonia is transported to the site in pressurized trucks and transferred to spherical storage vessels. The ammonia is filtered, then vaporized in an ammonia vaporizer. The ammonia is then filtered again and mixed with compressed filtered air to create a 90 percent air - 10 percent ammonia mixture.

The ammonia/air mixture is then further heated in a waste heat steam boiler to increase the temperature to about 1650°F and a pressure of 112 psig. This mixture then passes into the tail gas heater and the platinum-rhodium filter element reactor. This process catalytically oxidizes the ammonia mixture, as shown in the following reactions (the desired reaction is marked by an asterisk):

$$4NH_3 + 3O_2 \rightarrow 2N_2 + 6H_2O$$
$$4NH_3 + 4O_2 \rightarrow 2N_2O + 6H_2O$$
$$* \; 4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O \; *$$
$$4NH_3 + 7O_2 \rightarrow 4NO_2 + 6H_2O$$
$$4NH_3 + 6NO \rightarrow 5N_2 + 6H_2O$$

The gases are then cooled, and the nitric oxides react with oxygen to produce nitrogen dioxide:

$$2NO + O_2 \rightarrow 2NO_2$$

Following this stage, the products are injected into the air heater/cooler condenser and into the absorber. Additional filtered air is added along with distilled water. The nitrogen dioxide is absorbed in water to form nitric acid, as shown in the following reactions in their probable sequence:

$$2NO_2 + H_2O \rightarrow 2HNO_3 + HNO_2$$
$$2HNO_2 \rightarrow H_2O + NO + NO_2$$
$$3NO_2 + H_2O \rightarrow 2HNO_3 + NO$$
$$2NO + O_2 \rightarrow 2NO_2$$

Nitric acid is withdrawn from the absorber and stored for use in the north plant. Waste gases, primarily consisting of nitric oxide and nitrogen dioxide, are drawn from the absorber, heated, and energy is recovered in centrifugal expanders which drive the air inlet air compressor. Waste gases are then discharged from the stack.

Potassium Nitrate Production

Potassium nitrate (KNO_3; saltpeter; nitrate of potash) is the potassium salt of nitric acid. It is manufactured by the direct reaction of potassium chloride with concentrated nitric acid to produce potassium nitrate and chlorine.

Pure KNO_3 contains 13.68 percent N and 46.58 percent K_2O. The domestic product is available in either prilled or standard crystalline form and has the following representative analysis: N, 13.91 percent; K_2O, 4.13 percent; Cl, 0.18 percent; acid insoluble, 0.10 percent; and moisture, 0.08 percent. The AAPFCO official definition for potassium nitrate states that the product shall contain not less than 12 percent nitrate nitrogen and 44 percent soluble potash (K_2O).

The Cedar Chemical production process utilizes potassium chloride KCl, which is obtained from a New Mexico mine owned and operated by Cedar, and the nitric acid (HNO_3) from the south plant to produce potassium nitrate (KNO_3), chlorine gas (Cl_2), and, optionally, nitrogen tetroxide (N_2O_4). KNO_3 is produced as a crystallized solid, which is either dried, cooled, and sent to storage or dried, melted, and prilled before cooling and storage.

KCl is delivered to the process facility in closed hopper rail cars of approximately 100-ton capacity. KCl is unloaded into a pit from which it is belt conveyed to a bucket elevator and into closed top storage bins. From the storage bins, the material is taken by bucket elevator to a screw conveyor which delivers the KCl into mixing vessel X-9 where it is mixed with nitric acid.

Nitric acid from the south plant is pumped via pipeline to a storage tank in the KNO_3 plant. The tank vents to the atmosphere through a 2-inch pipe.

HNO_3 from the storage tank is cooled and pumped to mixing vessel X-9 for combination with the KCl. The contents of X-9 flow by gravity to the first reaction vessel V-1, where they are heated to accelerate the reaction between HNO_3 and KCl.

The reaction of HNO_3 and KCl produces a mixture of gaseous reaction products which consist primarily of Cl_2, NO_2, NOCl, and unreacted HNO_3 vapor. The remaining liquid phase consists primarily of KNO_3 in HNO_3 with traces of unreacted chlorides.

Liquid phase material exiting V-1 flows by gravity to secondary reaction vessels C-2 and C-2X (in series), where residual chloride is oxidized to Cl_2. The Cl_2, along with other reaction products (NO_2, etc.) produced in C-2 and C-2X are vented back to and through V-1.

Gases from the KCl-HNO_3 reaction are carried into gas phase reaction column C-1. In this column, recycled 85 percent HNO_3 is added and heated to further oxidize NOCl to Cl_2 and NO_2. The column is provided with a reflux condenser to recycle the contents and facilitate oxidation.

Gases exiting C-1 and passing the reflux condenser are condensed downstream in preparation for fractionation of Cl_2 from N_2O_4 and NOCl. Gases not condensed at this stage are vented to scrubber C-10, which uses recirculating caustic soda as the scrubber liquor.

Condensed Cl_2 and N_2O_4, with unreacted NOCl, are fed to fractionating column C-5. A reflux condenser is provided for recycling. Condensed Cl_2 is separated and stored as liquid Cl_2 under pressure at approximately 50°F. Column underflow is fed to the second fractionating column C-6.

In C-6, impurities are distilled from liquid N_2O_4. A reflux condenser is provided for recycling. Column overheads (NOCl) are routed to C-1. Nitrogen tetroxide is pumped either to storage at ambient temperature under its own pressure or is recycled to the internal strong acid plant (Column C-7A) to make 85 percent HNO_3 for use in C-1. N_2O_4 not recovered as 85 percent HNO_3 is routed to the internal weak nitric acid plant (columns 7-B, 7-C, and 7-D) for recovery as 65 percent HNO_3. This acid is recycled to mixing vessel X-9.

Overhead condensers on C-1 and C-5 are refrigerated using chlorofluorocarbon refrigerants. Refrigeration equipment is driven by steam from an NSPS boiler. The boiler provides steam for process heat also.

Material flowing from C-2X travels to column C-3 where it is heated to evaporate water and increase the concentration of KNO_3. Vapor from C-3 is conducted to column C-4 for recovery of HNO_3. Column C-4 is heated. Vapors from C-4 vent to a set of barometric condensers operating in series to produce a vacuum for the crystallizer system. Liquids from C-4 are routed to the internal weak acid nitric acid plant (columns 7-B, 7-C, and 7-D) to produce 65 percent HNO_3. There is a fresh water make-up to the C-4 column. Gases exiting the 65 percent HNO_3 recovery unit are discharged to the atmosphere through process vent C-7.

Uncondensed vapors from the barometric condensers are sent to column C-15. C-15 is an aqueous scrubber serving the barometric condensers, the product dryer, and the product centrifuge evacuation system. There is fresh water make-up to this column. Scrubbed gases from C-15 are discharged to the atmosphere; recovered liquids are routed to C-4.

Material underflow from C-3 is routed to three heated vacuum evaporator-crystallizers. The evaporator-crystallizers can operate as single or multiple effect units. Vacuum is supplied by the barometric condensers mentioned above. Cooling water to the condensers recirculates over a cooling tower and is pH controlled by the addition of caustic soda.

Vapors from the evaporator are passed through a water-cooled condenser as they travel to column C-4 for capture of uncondensed HNO_3. The evaporation of liquid in the evaporator section of each unit causes KNO_3 to crystallize and form a slurry of KNO_3 in HNO_3. HNO_3 captured from the evaporators is stored in tank V-13 and routed to the strong HNO_3 plant.

The slurry is pumped from the crystallizers to two ejector type centrifuges. The centrifuges produce a wet KNO_3-HNO_3 cake for feed to the product dryer. Mother liquor is returned to the crystallizers. HNO_3 fumes are evacuated from the centrifuges to the C-15 scrubber.

Centrifuge solids are fed on a shaker conveyor to a counter-current, natural gas fired, rotary shell dryer. Depending upon the grade of product desired, the dryer feed is pH adjusted with either caustic soda (NaOH) or caustic potash (KOH) to eliminate as much acidity from the feed as possible.

Material exiting the dryer is routed to either a cooler or to a melting tank for prilling. Air flow through the dryer is routed into a cyclone for recovery of suspended particulate material. Cyclone solids are then combined with the dryer product. Cyclone gases are routed to the C-15 scrubber.

Crystallized, dried product intended for storage is cooled by air flow through a rotary shell, water-cooled cooler. Material exiting the cooler is routed through bucket elevators and belt conveyors to storage in a roofed storage building which segregates products by grade. Airflow through the cooler is routed to a wetted-approach venturi scrubber before being exhausted to the atmosphere. Cooler scrubber water recirculates with makeup and blowdown being about equal. Cooler scrubber blowdown is routed to the plant process drains.

Dried product intended for prill production is diverted to a natural gas fired melting tank. Molten KNO_3 is pumped to a perforated drum at the top of the prilling tower. Prill particle size can be adjusted by the use of different sized perforations in the drum. The prilled material falls to a shaker conveyor and elevator combination which delivers the hot material to the product cooler. Prilled product is screened prior to storage and screen rejects are recycled to the melting tank.

KNO_3 is handled as a bulk or bagged product. Bulk loadout of KNO_3 generates fugitive losses.

After production and storage, the gaseous products are loaded into rail cars, trucks, or gas cylinders. Before being loaded, each container (rail car, truck, or cylinder) must be evacuated of residual material. Rail cars may contain 2,000 to 4,000 pounds of chlorine which is evacuated to the C-10 caustic scrubber. Nitrogen tetroxide when unloaded is returned to storage or processing. Chlorine from rail cars contains excessive amounts of non-condensable gases such as nitrogen; the chlorine cannot be recovered with present day equipment.

The C-10 scrubber is a packed column scrubber which uses recirculating caustic soda as the scrubber liquor. The caustic strength is 15-16 percent when fresh, and is changed upon depletion to 2 percent. The reaction of Cl_2 and NaOH primarily produces sodium hypochlorite. Venting of rail car contents places a heavy demand upon the scrubber.

The scrubber liquor, when depleted, is pumped to a heated holding tank where a small amount (approximately 1.5 pounds) of nickel sulfate is added to catalyze decomposition of hypochlorite to chlorides and oxygen. The remaining caustic is used to neutralize acidic spills and equipment washouts from the KNO_3 plant. Drainage from the plant is collected in below surface pits and pumped through a pH adjusting unit before discharge to NPDES Outfall 002.

2.0 HAZARDOUS SUBSTANCES

2.1 EPCRA Reporting Requirements

The Cedar Chemical facility is subject to the Emergency Planning and Community Right-To-Know Act (EPCRA) notification and reporting requirements. Per EPCRA Section 311, Cedar Chemical has submitted material safety data sheets (MSDS) to the City of Vicksburg Fire Department, the Warren County Emergency Planning Committee, and the Mississippi Emergency Response Commission.

Per EPCRA Section 312, a Tier II report for 1991 (Appendix A) was submitted to the above entities prior to the March 1, 1992, deadline. The Tier II report provides information concerning types and quantities of chemicals used at the facility.

Per EPCRA Section 313, the facility submitted a Toxic Chemical Release form (Form R) for 1990 (Appendix B) prior to July 1 of 1991. The Form R for 1991 is not due for submittal until July 1, 1992.

The 1990 Form R included toxic chemical inventories for:

- Ammonia
- Ammonium Nitrate Solution
- Chlorine
- Nitric Acid
- Sulfuric Acid

2.2 Occupational Safety and Health Administration (OSHA) Requirements

The plant is subject to the Employee-Right-To-Know provisions of 29 CFR 1910.120. The plant has a written Employee-Right-To-Know program maintained by the plant Safety Director, Mr. Roger Holdiness. Employee Right-To-Know signs are posted at the facility. Flammable material storage areas are marked as such, and tanks containing flammable materials are grounded. MSDS's are maintained by the Safety Director. Copies are available for review by employees. Copies of the MSDS's are maintained at each production unit.

Periodic training is conducted by the Safety Director and the Health, Safety, and Training Officer. Cedar Chemical is an approved OSHA training facility, and has provided the appropriate level of training to all technical and production personnel. Cedar Chemical has prepared an overall OSHA training manual; a copy is supplied to all employees. The contents page of the training program manual is included in Appendix C of this report. Comprehensive testing is conducted at the conclusion of the training program; a sample exam is included in Appendix C. The Safety Director is responsible for the orientation training for all new employees. Annual refresher training is also conducted as appropriate. All training is documented and records are maintained by the Safety Director. All plant workers also participate in a medical monitoring program which meets the OSHA requirements.

Due to the production of chlorine gas at the facility, all employees working within the production section of the plant may be required to wear respirators, Scott Air Packs, or self contained breathing apparatus (SCBA) during certain work assignments or emergency responses. Therefore, the plant must comply with OSHA respiratory protection rules. The Cedar facility maintains a written respiratory program; respiratory training is included in the training program described above. The respiratory training consisting of demonstrations and hands-on instruction (including fit testing for appropriate attendees) is included in the initial training. Additional periodic training and fit testing are also conducted and recorded by the Safety Director.

Maintenance on all respirators, SCBAs, and other personal protective equipment is carried out per standard maintenance checklists. Equipment which is subject to periodic expiration, such as respirator cartridges, are utilized in training exercises so that there is a continuous rotation of such equipment.

No record was found of civil or regulatory action or complaints concerning exposure to hazardous chemicals.

2.3 Safe Drinking Water Act (SDWA)

Drinking water is supplied by the Vicksburg municipal system.

2.4 Toxic Substances Control Act (TSCA)

The Cedar Chemical Facility does not manufacture, import or export any chemicals which are subject to premanufacture notifications. The facility has never manufactured, sold, or produced chlorofluorocarbons, dioxin, TCDD, agent orange, 2,4,5-T/Silvex, or asbestos.

All transformers on the site have been tested for PCBs. All PCB transformers were either retrofitted, with the PCB-contaminated materials submitted for incineration, or were completely replaced. Sample manifests and disposal documentation concerning PCB-contaminated materials are shown in Appendix D. All transformers presently onsite are classified as "non-PCB" transformers (less than 50 ppm).

2.5 Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

Although Cedar Chemical no longer manufacturers pesticides, the facility continues to submit a Pesticides Report for Pesticides-Producing Establishments on an annual basis. The 1991 report is included in Appendix E. The only substance included in the report is chlorine gas.

According to plant personnel, no pesticide applications have been rejected by the EPA, and the facility has never been cited, fined, or involved in any legal actions related to registration issues. The facility is not involved in the application of pesticides. The facility does not produce or store pesticides classified as *highly toxic* or *mildly toxic*.

2.6 Hazardous Materials Transportation Act (HMTA)

The facility is not a transporter of hazardous materials, nor has it ever transported hazardous materials in company vehicles. However, it is a "shipper" of hazardous wastes, and is therefore responsible for proper classification, containerization, packaging, labeling, placarding, and manifesting of such materials. The plant personnel appeared to be knowledgeable of their requirements under HMTA.

One truck spill of toxaphene was noted to have occurred in Dade City, Florida, in the early 1980s. The material was cleaned up at the time of the accident, and the matter is considered resolved.

2.7 Spill Prevention, Control, and Countermeasures (SPCC)

This facility possesses several above-ground storage tanks which store diesel fuel, gasoline, and various types of oil. The total capacity of all above-ground tanks which contain petroleum products is 207,950 gallons. Therefore, the facility is subject to the SPCC planning requirements. The facility has an SPCC plan which meets the requirements of 40 CFR 112, and which was revised and updated earlier this year. The storage tank diking around petroleum storage areas is sufficient for secondary containment purposes. The plan has been certified by a registered professional engineer. A copy of the SPCC plan is included in Appendix F.

Many of the chemical tanks on the site contain no secondary containment. While the SPCC requirements apply only to petroleum products, it would be advisable to construct secondary containment structures around these additional tanks to contain any leakage or spillage.

The facility maintains emergency response plans and disaster plans for chemical incidents. The designated Emergency Coordinators are the Plant Manager and the Director of Environmental Affairs. No agreements exist with offsite response companies for use during emergencies, although such companies may be requested for specific situations. Spill cleanup procedures are those specified in the MSDS's.

2.8 Underground Storage Tanks

The facility currently possesses no underground storage tanks.

In the past, the facility possessed three underground storage tanks. Two of the tanks contained gasoline, while the third contained diesel fuel. The tanks were removed and the site was closed in December, 1988. Soil samples were obtained and analyzed for benzene, ethyl benzene, toluene, and total xylenes (BTEX) and for total recoverable petroleum hydrocarbons (TRPH). The results were all below required action limits.

Copies of the documentation concerning the UST removal and closure are included in Appendix G.

2.9 Miscellaneous Provisions

No radon studies have been conducted at this facility. The facility possesses no radioactive devices or sources.

3.0 AIR EMISSIONS

3.1 Process Information

The potassium nitrate plant and the nitric acid plant are both operating under an existing air emissions permit, as are several natural gas fired boilers, the natural gas fired dryer, and the natural gas fired melt tank. The individual permitted units, their allowable emission rates, production rates, and monitoring requirements are summarized in Table 3-1.

The Cedar Chemical facility has a sophisticated air pollution control system to minimize air pollution emissions. A total of four scrubbers and one baghouse are presently employed to reduce these emissions. Two packed column scrubbers in series are also being added in the IRFNA process.

The existing air emissions control equipment is described below:

- Caustic Scrubber C-10

  Scrubber C-10 uses a recirculating solution of sodium hydroxide as the scrubber liquor. When fresh, the solution is approximately 15-16 percent NaOH. It is considered spent when the concentration of NaOH reaches 2 percent. Materials entering the scrubber include uncondensed chlorine gas from the V-34 freon condenser, residual chlorine from rail cars and cylinders, and non-condensable gases from the V-34 freon condenser (primarily NO_x). The scrubber is effective at reacting with the chlorine to produce hypochlorite for later treatment to chlorides.

- Aqueous Scrubber C-15

  Scrubber C-15 receives HNO_3 fumes from the product centrifuges and gases from the product dryer the barometric condensers. Gases include HNO_3 and NO_x. A fresh water makeup is used, and scrubber liquor is discharged to the internal weak acid plant. Nitric oxides comprise the primary gaseous emissions from this unit. The scrubber is effective at removal of HNO_3 fumes from the air. Also, some NO_x is removed via diffusion. However, a great deal of the NO_x merely passes through the unit.

- Rotary Shell Air Cooler and Bagging/Loading Venturi Scrubbers

  The rotary shell air cooler is used for cooling the KNO_3 product after exiting the dryer or the prilling tower. Particulate matter (KNO_3 dust) collected in the air stream then

TABLE 3-1
AIR EMISSIONS DATA AND EQUIPMENT

	AIR EMISSION POINT SOURCE								
	001	002 - Potassium Nitrate Plant							
	Nitric Acid Plant	Pulping Leg Vent (X-9)	Vent Gas Scrubber (C-10)	Centrifuge, Dryer, and Water Rectifier Scrubber (C-15)	Extended Absorber (C-7)	Prill Tower	Cooler Scrubber	Storage Baghouse	Bagging/ Loading Scrubber
Emission Limitation	Nitrogen Oxides (NO_x)								
	3 lb/ton 136.9 tpy	30.0 lb/hr 131.4 tpy	10.0 lb/hr 43.8 tpy	30.0 lb/hr 131.4 tpy	15.0 lb/hr 65.7 tpy	N/A	N/A	N/A	N/A
	Opacity								
	10% Max.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Particulate Matter								
	N/A	N/A	N/A	N/A	N/A	.40 lb/hr 15.8 tpy	2.0 lb/hr 8.76 tpy	1.0 lb/hr 0.79 tpy	2.0 lb/hr 2.44 tpy
	Chlorine								
	N/A	N/A	3.0 lb/hr	N/A	N/A	N/A	N/A	N/A	N/A
Production or Operation Parameter	250 tpd 24 hr/day 365 dpy	N/A	N/A	N/A	NA/	15.04 tph 79,000 tpy	N/A	1,580 hpy (365-day rolling average)	2440 hpy (365-day rolling average)
Monitoring Criteria	Periodic Stack Testing	Periodic Stack Testing	Periodic Stack Testing	Periodic Stack Testing	Periodic Stack Testing	Annual Production Operations Report	N/A	N/A	N/A

TABLE 3-1 AIR EMISSIONS DATA AND EQUIPMENT						
	AIR EMISSION POINT SOURCE					
	004	005	006	007	008	009
	187.2 MMBTU/hr Natural Gas Fired Erie City Boiler	10.5 MMBTU/hr Natural Gas Fired Eclipse Boiler	28 MMBTU/hr Natural Gas Fired KNO_3 Melt Tank	11 MMBTU/hr Natural Gas Fired KNO_3 Dryer	214.4 MMBTU/hr Natural Gas Fired Foster-Wheeler Boiler	Inhibited Red Fuming Nitric Acid Process (2 Packed Column Scrubbers)
Emission Limitation	Nitrogen Oxides (NO_x)					
	102.14 lb/ton 73.54 tpy	1.46 lb/hr 1.05 tpy	3.89 lb/hr 17.03 tpy	1.53 lb/hr 6.69 tpy	0.2 lb/hr 146.5 tpy	0.01 lb/hr 0.044 tpy
	Opacity					
	40%	40%	40%	40%	20%	40%
	Particulate Matter					
	0.556 lb/hr 0.40 tpy	0.028 lb/hr 0.02 tpy	0.0845 lb/hr 0.37 tpy	0.032 lb/hr 0.14 tpy	0.64 lb/hr 2.18 tpy	N/A
	PM_{10}					
	0.556 lb/hr 0.40 tpy	0.028 lb/hr 0.02 tpy	0.0845 lb/hr 0.37 tpy	0.032 lb/hr 0.14 tpy	0.64 lb/hr 2.18 tpy	N/A
	Sulfur Dioxide					
	0.111 lb/hr 0.08 tpy	0.007 lb/hr 0.005 tpy	0.017 lb/hr 0.073 tpy	0.0062 lb/hr 0.029 tpy	0.128 lb/hr 0.436 tpy	N/A
	Carbon Monoxide					
	7.43 lb/hr 5.35 tpy	0.361 lb/hr 0.26 tpy	0.973 lb/hr 4.26 tpy	0.381 lb/hr 1.67 tpy	30.65 lb/hr 104.71 tpy	N/A

TABLE 3-1
AIR EMISSIONS DATA AND EQUIPMENT

	AIR EMISSION POINT SOURCE					
	004	005	006	007	008	009
	187.2 MMBTU/hr Natural Gas Fired Erie City Boiler	10.5 MMBTU/hr Natural Gas Fired Eclipse Boiler	28 MMBTU/hr Natural Gas Fired KNO_3 Melt Tank	11 MMBTU/hr Natural Gas Fired KNO_3 Dryer	214.4 MMBTU/hr Natural Gas Fired Foster-Wheeler Boiler	Inhibited Red Fuming Nitric Acid Process (2 Packed Column Scrubbers)
Emission Limitation	Volatile Organic Compounds					
	1.08 lb/hr 0.78 tpy	0.56 lb/hr 0.04 tpy	0.162 lb/hr 0.71 tpy	0.064 lb/hr 0.28 tpy	5.0 lb/hr 17.08 tpy	N/A
	Hydrogen Fluoride					
	N/A	N/A	N/A	N/A	N/A	0.01 lb/hr 0.044 tpy
Production or Operation Parameter	Fuel Usage: 267 MMSCF/yr 365-day rolling average	Fuel Usage: 15 MMSCF/yr 365-day rolling average	Max. Rated Capacity Year-Round	Max Rated Capacity Year-Round	Fuel Usage: 1,453.33 MMSCF/yr 365-day rolling average	Permitted For Construction of Air Emissions Equipment
Monitoring Criteria	Quarterly Reporting of Fuel Usage	Quarterly Reporting of Fuel Usage	None	None	Quarterly Reporting of Fuel Usage; Periodic Stack Testing	None

passes through a venturi scrubber. The air stream also collects a large quantity of dust from other material handling activities. The bagging/loading scrubber collects dust from the bagging/loading operations. Recirculating water is used as the scrubber liquor in both units. Blowdowns of the scrubber liquor to the process drains are periodically performed.

- Storage Baghouse

  Large quantities of dust are generated within the product storage warehouse. A baghouse is in place to filter and collect these materials. However, due to the hygroscopic nature of the product, moisture tends to cause agglomeration and caking on the filter fabric surfaces. This is difficult to remove and significantly reduces cycle times.

The existing scrubbers appear to be effective at meeting the existing permit requirements. However, the dust collection units (baghouse, venturi scrubber) are either of insufficient capacity to adequately remove particulate materials or are of a poor design.

3.2 Regulatory Criteria

The Cedar Chemical facility is located in an area which is in attainment for all National Ambient Air Quality Standards (NAAQS). The plant does not meet the definition of a "major source" per the criteria under the Prevention of Significant Deterioration (PSD) regulations. The nitric acid plant (Emission Point 001) and the Foster-Wheeler boiler (Emission Point 008) are required to comply with the New Source Performance Standards (NSPS) described in 40 CFR 60, Subparts A and G (nitric acid plant) and Subparts A and Db (Foster-Wheeler boiler).

The plant is currently subject to two air pollution control permits. Appendix H contains copies of these two permits. Permit No. 2780-00041, issued by the Mississippi Environmental Quality Permit Board on August 13, 1991, and scheduled to expire on August 1, 1996, provides authorization to operate the nitric acid plant, the potassium nitrate plant, and the boilers, dryer, and melt tank described in Table 3-1. Several additional provisions pertain to the potassium nitrate plant which are not included in Table 3-1; these are described in the permit in Appendix H. Continuous ambient monitoring for nitrogen oxides is required as well. A construction permit (No. 2780-00041) has also be issued to allow the construction of air emissions equipment (two packed column scrubbers) for the Inhibited Red Fuming Nitric Acid (IRFNA) process. This permit was issued on December 17, 1991.

3.3 Compliance

The facility appears to be meeting the majority of the emissions requirements set forth in the permits. Occasional minor excursions occur due to equipment malfunctions. Also, malfunctions or routine maintenance on monitoring equipment result in intermittent periods when continuous monitoring is not performed. Samples of required reports are included in Appendix I. This appendix also contains the latest results from NO_x stack testing, which was performed in February-March, 1990. Samples of reports concerning minor excursions are included in Appendix J.

A reportable quantity release of nitrogen dioxide occurred on February 11, 1992, due to a process upset. The incident was reported to the National Response Center, the Mississippi Emergency Response Commission, the Warren County Emergency Planning Commission, and the Mississippi Bureau of Pollution Control. Appendix K contains the written followup report concerning this incident.

A large quantity of particulate material is lost due to poor materials handling practices and inadequate dust removal equipment. This results in excessive quantities of airborne particulates which are probably in excess of allowable limitations. The facility is currently implementing a Waste Minimization program which addresses these emissions and may be effective at minimizing them.

Under the terms of the 1990 Clean Air Act Amendments, the plant will be subject to more stringent air emission limits. However, the facility appears to have sufficient air pollution control systems to meet the new standards. Excessive particulate emissions of the type produced at this plant do not appear to be addressed in the new amendments.

The most likely impact of the new amendments will be regarding emissions of *hazardous air pollutants* (HAPs). The amendments define two types of sources of hazardous air pollutants: major and area sources. A major source is a stationary source which emits or has the potential to emit 10 tons per year or more of a listed pollutant or 25 tons per year or more of a combination of listed pollutants. Area sources are those that emit lesser quantities.

Cedar Chemical currently uses the following chemicals which have been designated as HAPs:

- Chlorine
- Hydrogen Fluoride
- Methyl Chloride
- Nickel Compounds

It is likely that Cedar Chemical would be classified as a major source due to the production of chlorine. Cedar Chemical's activities are also included within several categories of major and area sources for HAPs, including Production and Use of Inorganic Chemicals (Chlorine, Fertilizer Formulation and Use), Fuel Combustion, Waste Treatment and Disposal (Groundwater Cleaning, Wastewater Treatment Systems), and Miscellaneous (Industrial Cooling Towers).

Implementation of the new amendments will be in the form of a two-tiered approach. The first phase will involve the establishment of technology-based standards (maximum achievable control technology) for each category and subcategory of HAP major and area sources. The second phase involves an assessment of risk to public health remaining after application of MACT standards and the promulgation of additional standards to protect the public health. Since it appears that these regulations will significantly impact Cedar Chemical's operations, it may be advisable to perform an HAP emissions survey to more accurately determine present emission levels in order to be better prepared for future regulatory requirements.

The new amendments also contain provisions regarding procedures for new source construction or modification of existing sources. This may impact Cedar Chemical during any future plant alterations or additions.

Since the facility emits sulfur dioxide and nitrogen oxides, it may wish to participate in the acid rain program. While participation in this program is required for utilities, an industrial facility can voluntarily participate if it can reduce its sulfur dioxide emissions sufficiently to obtain allowances, which can then be sold to generate revenue for the company. As this would be dependent upon the facility being able to efficiently reduce sulfur dioxide emissions, this may not be a feasible course of action.

3.4 Asbestos

The facility has removed and disposed of a large quantity of asbestos-containing materials over the past two years. These materials have been comprised of pipe cladding and boiler insulation. It appears that the removal operations have been conducted in accordance with the appropriate safety criteria. These past abatement activities have been conducted by Asbestos Abatement Systems of Hattiesburg, Mississippi. All asbestos-containing materials have been disposed of through landfilling. The majority of such wastes were deposited in the BFI Little Dixie Landfill in Madison, Mississippi. The Warren County Landfill has also been utilized.

The asbestos abatement activities appear to have been conducted per the appropriate safety and regulatory criteria. Samples of asbestos abatement documentation are included in Appendix L. These include state notifications, bulk sampling reports, air sampling reports, and manifests.

4.0 WATER EMISSIONS

4.1 Water Supplies

The Cedar Chemical plant is supplied by the City of Vicksburg municipal potable water supply. No onsite wells are used.

4.2 Waste Water

The facility discharges sanitary wastewater to the Vicksburg municipal sanitary sewer system (the municipal wastewater treatment plant is located immediately to the east of the Cedar Chemical potassium nitrate plant). No industrial wastewaters are discharged into the municipal system. All industrial and process waters exit the plant either within products or into the Mississippi River via permitted NPDES outfalls. The NPDES status of the facility is discussed in Section 4.4 of this report.

Wastewater from the north plant, which includes process wastewaters, cooling water, boiler blowdown, and surface runoff, is treated via neutralization within the North Plant Neutralization System. Prior to installation of this system, wastewaters were neutralized with lime in the now inactive north plant surface impoundment. The wastewaters treated at the north plant originate from both the process areas and from the scrubbers which are used to treat the off-gases and particulates generated in the production process. After neutralization, the north plant wastewaters are pumped via pipeline to the south plant. Midway between the north and south plants, cooling water from a cooling tower is combined with the effluent from the north plant. A pH sensor is installed so that if the pH of the combined flow is outside the allowable discharge limits, the combined flow will be diverted into the south plant surface impoundment mentioned in the following paragraphs.

Wastewater from the south plant consists of nitric acid process wastewaters and stormwater runoff from soils contaminated with organic chemicals from past pesticide production activities. All wastewaters collected at the south plant are channeled to the south plant surface impoundment ponds. The wastewaters are then pumped through a Calgon granular activated carbon adsorption treatment system.

The effluent from the carbon adsorption system and the wastewaters from the north plant are combined prior to discharge to the Mississippi River.

In the past, plant wastewaters were discharged into a septic tank/leach field system which was located immediately south of the existing surface impoundment. It is assumed that considerable quantities of water contaminated with pesticides, organic chemicals, and inorganic chemicals were discharged through this system. A portion of the pea gravel drain field sediment was excavated in 1989 during excavation work on the surface impoundment. However, the septic tank, also referred to as a chemical crypt, remains in place.

4.4 Storm Water

Much of the storm water runoff from the north and south plants is collected and treated prior to discharge through the NPDES permitted outfalls. However, a percentage of the runoff is not contained. Storm water runoff from the north plant which is not contained flows via drainage ditches into Stouts Bayou. This bayou flows along the eastern border of the facility and empties into Hennessey's Bayou, which empties into the Mississippi River. Storm water runoff from the south plant which is not channeled into the surface impoundment flows south through drainage ditches into Hennessey's Bayou. A portion of this runoff enters two large potential wetlands areas which located to the south of the nitric acid plant.

4.5 NPDES Permit

This plant has three outfalls under NPDES permit number MS0027995, which is shown in Appendix M. This permit was granted July 9, 1991, and expires July 8, 1996. The latest application, submitted in December, 1990, is included in Appendix N. Outfalls 001 (south plant) and 002 (north plant) are internal outfalls which channel the discharges from the respective wastewater treatment units. These discharges are combined to form Outfall 003, which discharges through a 10-inch pipeline into the Mississippi River.

The discharge limitations and monitoring requirements for the three outfalls are shown in Table 4-1.

Monitoring records indicate that the facility is in compliance in meeting the effluent limitations specified for all outfalls. Copies of the February and March, 1992, Discharge Monitoring Reports are included in Appendix O. There have been only five excursions since 1985; all were corrected the same day and appear to have been due to minor operational problems with the various treatment systems. Copies of the five excursion reports are shown in Appendix P. Biomonitoring of the effluent from Outfall 003 has also been in compliance. The latest biomonitoring report, which was completed in February, 1992, is shown in Appendix O.

TABLE 4-1 NPDES DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS						
	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
	kg/day (lb/day)		Other Units		Measurement Frequency	Sample Type
PARAMETER	Daily Average	Daily Maximum	Daily Average	Daily Maximum		
Outfall 001 - Nitric Acid Plant						
Flow (M^3/day)	Report	Report	N/A	N/A	Continuous	Recorder
Chemical Oxygen Demand	341 (750)	492 (1083)	N/A	N/A	Twice/Week	24-Hour Composite
Biochemical Oxygen Demand (5-Day)	61 (133)	280 (616)	N/A	N/A	Twice/Week	24-Hour Composite
Total Suspended Solids	68 (150)	231 (508)	N/A	N/A	Twice/Week	24-Hour Composite
DNBP (Dinoseb)	1.4 (3.0)	2.7 (6.0)	0.4 mg/l	0.8 mg/l	Twice/Week	24-Hour Composite
Toxaphene	0.005 (0.1)	0.27 (0.58)	0.0015 mg/l	0.0075 mg/l	Once/Quarter	24-Hour Composite
Outfall 002 - Potassium Nitrate Plant						
Flow (M^3/day)	Report	Report	N/A	N/A	Continuous	Recorder
Nitrate	2313 (5100)	4625 (10200)	N/A	N/A	Twice/Week	24-Hour Composite

<table>
<tr><th colspan="7">TABLE 4-1
NPDES DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS</th></tr>
<tr><th rowspan="3">PARAMETER</th><th colspan="4">DISCHARGE LIMITATIONS</th><th colspan="2">MONITORING REQUIREMENTS</th></tr>
<tr><th colspan="2">kg/day (lb/day)</th><th colspan="2">Other Units</th><th rowspan="2">Measurement Frequency</th><th rowspan="2">Sample Type</th></tr>
<tr><th>Daily Average</th><th>Daily Maximum</th><th>Daily Average</th><th>Daily Maximum</th></tr>
<tr><th colspan="7">Outfall 003 - Total Plant Effluent</th></tr>
<tr><td>Flow (M^3/day)</td><td>Report</td><td>Report</td><td>N/A</td><td>N/A</td><td>Continuous</td><td>Recorder</td></tr>
<tr><td>Nitrate (N)</td><td>2598 (5730)</td><td>4865 (10727)</td><td>N/A</td><td>N/A</td><td>Twice/Week</td><td>24-Hour Composite</td></tr>
<tr><td rowspan="6">Additional Requirements for Outfall 003</td><th colspan="2">Parameter</th><th colspan="2">Limitation</th><th colspan="2">Monitoring Frequency</th></tr>
<tr><td colspan="2">pH</td><td colspan="2">Minimum: 6.0
Maximum: 9.0</td><td colspan="2">Twice/Week</td></tr>
<tr><td colspan="2">Floating Solids
Visible Foam</td><td colspan="2">None Other Than Trace Amounts</td><td colspan="2">None Specified</td></tr>
<tr><td colspan="2">Visible Sheen on Receiving Waters</td><td colspan="2">None</td><td colspan="2">None Specified</td></tr>
<tr><td colspan="2">Bioassay Tests</td><td colspan="2">90% Survival</td><td colspan="2">Semi-Annually</td></tr>
<tr><td colspan="2">Nitrates
Chlorides
Total Dissolved Solids
NH_3-N
Total Residual Chlorine
Free Available Chlorine
Toxaphene
DNBP
Flow Rate</td><td colspan="2">None</td><td colspan="2">Semi-Annually, Concurrent with Bioassay Test</td></tr>
</table>

During 1984 and 1985, numerous violations of the NPDES permit conditions were reported. At this time, Vertac Chemical was the operator of the facility. The violations included noncompliance with the limits for pH, dinoseb concentrations, and nitrate-nitrogen. There were also conditions in which heavy rainfall resulted in the bypassing of the south plant surface impoundment. Several meetings were held between Vertac and the Mississippi Department of Natural Resources, after which additional controls and procedures, such as improved pH control valves and revised impoundment methods, were implemented. As noted above, very few excursions have occurred since 1985, and all were of a relatively minor nature, easily and quickly corrected.

The Mississippi Department of Environmental Quality Industrial Wastewater Control Branch performs periodic compliance inspections of NPDES permitted facilities. The latest inspection was conducted in August, 1991. The inspection revealed that the Cedar Chemical facility was in compliance. A copy of the report is included in Appendix Q.

The existing NPDES permit will expire on July 8, 1996. The permit reapplication will be due 180 days prior to this date. The facility is also subject to the storm water permitting regulations promulgated by the U.S. EPA in November, 1990. Cedar Chemical intends to submit an application for an individual permit as soon as an acceptable storm event occurs. Three sampling points have been identified which it appears will provide representative samples of the runoff discharging from the industrialized areas. The deadline for individual applications is October 1, 1992.

4.6 Wetlands

There is at least two areas of potential wetlands on the property; both are located to the south of the nitric acid plant. A wetlands determination should be conducted prior to any filling, dredging, or draining activities of these areas. The official determination must be performed by the U.S. Corps of Engineers, in accordance with the Clean Water Act requirements.

5.0 SOLID AND HAZARDOUS WASTE

5.1 Solid Waste

Solid waste such as office waste, cardboard, insulation, and other non-hazardous waste materials are currently placed in portable bins located across the plant site. These materials are transported offsite by Cedar Chemical personnel in company-owned vehicles to a local private sanitary landfill owned by Hallis Johnson. These wastes are also occasionally transported to the local Browning Ferris Industries transfer station for later landfill disposal.

Both the north and the south plants contain area where obsolete, damaged, or dilapidated equipment and debris has been deposited in the past. These are referred to as the north and south boneyards. These areas are not currently being used; however, considerable scrap materials remain from past activities.

Pesticide and pesticide-related materials were disposed of during the 1970s in a presently inactive filled area located to the south of the surface impoundment. The unit was originally a system of five unlined ponds. In 1979-80, approximately 4,000 drums of pesticide wastes were removed from the ponds and the area was graded and filled. No remedial activities were conducted, and no liners or leachate monitoring/collection systems were installed. The area currently experiences standing water following precipitation, and the side slopes are heavily eroded. Yellow stained soils are visible, indicating that dinoseb is rising out of the filled area.

The surface impoundment presently used for wastewater storage prior to treatment in the carbon absorption units are presently lined and possess a leachate collection system. These elements have been only recently installed. Prior to this, the ponds were unlined and possessed no means of groundwater protection. During the installation of the liner system, approximately 32,000 cubic yards of soils, sludges, and related debris were removed and landfilled onsite in an area adjacent to the ponds. The wastes were solidified prior to deposition in the landfill unit. The landfill was designed per RCRA criteria, with a double synthetic membrane liner underlying the fill area and a cap comprised of a synthetic membrane liner, a clay liner, and a layer of soil. Appropriate vegetative controls have been implemented to prevent erosion of the landfill cap, and a gas venting system is incorporated in the design. Although the landfill was designed per RCRA Subtitle D criteria, it was not technically subject to RCRA hazardous waste disposal criteria since the wastes within the surface impoundment were declared to be exempt from RCRA regulation, as described in Section 5.3 of this report.

The contaminated areas mentioned above are discussed further in Section 6.0 of this report.

5.2 Special Waste

Minor quantities of waste oil are produced at this facility. These materials are stored onsite in the north and south drum storage areas. The south plant possesses a 250-gallon waste oil tank; in the north plant, waste oil is stored in 55-gallon drums. Waste oils are shipped offsite to Industrial Pollution Control of Jackson, Mississippi for recycling or fuel blending. The oils are sampled annually for ignitability and toxicity; they are classified as non-hazardous.

Spent lead-acid batteries from company-owned vehicles have been generated at the facility. These spent batteries are returned to the manufacturers for recycling; as such, these materials are excluded from being classified as hazardous waste.

No medical wastes have ever been generated at this facility.

Several transformers containing PCB's which were located on the site have been either refurbished or removed. The PCB management and disposal system is described further in Section 2.4 of this report.

Because pesticides were produced at this facility from the early 1970s until the mid-1980s, pesticide wastes have been generated which required disposal. During the 1970s, such wastes were disposed of by landfilling and by wastewater discharge into the Mississippi River. Recently, pesticide wastes such as stockpiled dinoseb and residuals from sumps and drains have been handled as hazardous wastes. These materials have been disposed of either by incinerationor by deepwell injection. Also, quantities of pesticide-contaminated soils have been excavated for removal. These materials have been transported offsite as hazardous waste for incineration and landfilling in an approved hazardous waste landfill. The facility hazardous waste activities are discussed further in Section 5.3 of this report, while the soil contamination issues are discussed in detail in Section 6.0 of this report.

There are no underground injection wells located on the Cedar Chemical property.

5.3 Hazardous Waste Management

HW Generation

The plant is a fully regulated generator of hazardous waste. The solid waste streams at this facility are listed hazardous wastes. The 1989, 1990, and 1991 Hazardous Waste Generation Reports are included in Appendix R.

All hazardous wastes currently being generated are related to past practices at the facility. These wastes are comprised of pesticide-contaminated soils, debris, and spent carbon from the activated carbon columns which treated dinoseb-contaminated surface runoff. Other hazardous wastes generated in the recent past include pesticide contaminated residues from facility sumps and drains, stockpiled pesticide products which were banned from sale, and obsolete laboratory chemicals.

Table 5-1 provides a record of types and quantities of hazardous wastes generated, along with disposal sites and treatment/disposal methods.

Accumulation Areas

Two hazardous waste accumulation areas are currently utilized at the Cedar Chemical facility. The hazardous waste being generated at the time of the inspection was comprised of contaminated soil which was being drummed for shipment within the accumulation area. The company ships this waste every 90 days or less. All drums are properly labelled with the accumulation start date on each. The accumulation areas are inspected on a weekly basis to verify dates, labeling of containers, and other requirements (access, fire fighting equipment, etc.) are being followed. A copy of the inspection checklist is included in Appendix S.

The accumulation area is equipped with written emergency instructions, telephones, portable fire fighting equipment, and decontamination equipment. This emergency equipment is routinely tested and maintenance is performed to ensure proper operation. A contingency plan is in place which includes corrective procedures for dealing with fires, spills, and other emergency situations. A copy of this plan is included in Appendix T. Personnel training for hazardous site workers (OSHA 40-hour) hazardous materials technicians (OSHA 24-hour) and first responders (OSHA 8-hour) is conducted by authorized plant personnel.

Treatment/Disposal

South plant process wastewaters and surface runoff from the south plant, which contains appreciable levels of the various pesticide contaminants such as dinoseb and toxaphene, are treated onsite in a Calgon carbon adsorption treatment system. The system is comprised of six carbon columns; two are always in operation treating water from the service impoundments, two are on stand-by circulation, and two are undergoing carbon regeneration and/or replacement. Treated water is discharged through NPDES Outfall 001, and spent carbon is transported offsite as hazardous waste for activated carbon regeneration. Calgon Carbon Corporation has handled all activities related to carbon removal and replacement. Surface runoff collects in two sumps within the south plant, referred to as the south sump and the railroad sump. These sumps are pumped into the three ponds within the surface impoundment, along with south plant process

TABLE 5-1
HAZARDOUS WASTE GENERATION AND DISPOSAL INFORMATION

WASTE DESCRIPTION	EPA I.D. NUMBER	WASTE-GENERATING PROCESS	QUANTITY	TREATMENT/ DISPOSAL FACILITY	TREATMENT/ DISPOSAL METHOD
Dirt, Debris, and Tank Bottoms Contaminated with Dinoseb	P020	Redrumming of Product	268,170 lb (1989)	CECOS International Livingston, LA LAD000618298	Landfill
Spent Carbon From Carbon Adsorption Units Contaminated with Dinoseb	P020	Adsorption of Dinoseb-Contaminated Wastewaters	118,430 lb (1989)	Calgon Carbon Corp. Neville Island, PA PAD004319810	Activated Carbon Regeneration
			79,010 lb (1990)	Calgon Carbon Corp. Neville Island, PA PAD00036942	
			138,120 lb (1991)	Calgon Carbon Corp. Catlettsburg, KY KYD005009923 (93,070 lbs)	
				Calgon Carbon Corp. Neville, Island, PA PAD000736942 (45,050 lbs)	
Monosodium Methane Arsonate (MSMA) Wastewater	D004 (1989) K031 (1989)	Cleanout of MSMA Plant	55,324 gallons (1989)	Rollins Environmental Services Bayou Sorrel, LA LAD000778514	Deepwell Injection
	D004 (1990)		10,213 gallons (1990)		
Toxaphene-Contaminated Aluminum and Stainless Steel	P123	Dismantling Storage Tanks	56,720 lb (1989)	Chemical Waste Management Carlyss, LA LAD000777201	Landfill
Toxaphene Waste	P123	Residues from Toxaphene Tanks and Lines	550 gallons (1989)	Trade Waste Incineration Sauget, IL ILD098642424	Liquid Incineration

TABLE 5-1
HAZARDOUS WASTE GENERATION AND DISPOSAL INFORMATION

WASTE DESCRIPTION	EPA I.D. NUMBER	WASTE-GENERATING PROCESS	QUANTITY	TREATMENT/ DISPOSAL FACILITY	TREATMENT/ DISPOSAL METHOD
MSMA Floor Sweepings	D004 (1989) K031 (1989)	Floor Sweepings	6,030 lb (1989)	Chemical Waste Management (1989) Emelle, Alabama ALD000622464	Landfill
	D004 (1990, 1991)		29,440 lb (1990)	CECOS International Livingstone, LA LAD000618298 (14,950 lbs)	
				LAD069452340 (14,490 lbs)	
			178,090 lb (1991)	Texas Ecologists, Inc. Robstown, TX TXD069452340	
Sodium Arsonate Wash Water	D004	Washout and Cleaning of Storage Tank	20,503 gallons (1989)	Rollins Environmental Services Bayou Sorrel, LA LAD000778514	Deepwell Injection
DNBP (Dinoseb) Waste	P020	Cleaning Storage Tanks and Pits	9,020 lb (1991)	CWM Chemical Services Millington, TN TND000772186	Liquid Incineration
Formulated Dinoseb	P020	Product Banned From Sale by U.S. Government	68,582 lb (1991)	CWM Chemical Services Millington, TN TND000772186	Liquid Incineration
Groundwater Containing Dinoseb	P020	Groundwater (Not Hazardous Waste)	N/A (1991)	N/A	On-Site Carbon Adsorption Treatment

TABLE 5-1
HAZARDOUS WASTE GENERATION AND DISPOSAL INFORMATION

WASTE DESCRIPTION	EPA I.D. NUMBER	WASTE-GENERATING PROCESS	QUANTITY	TREATMENT/ DISPOSAL FACILITY	TREATMENT/ DISPOSAL METHOD
Dirt, Trash, Steel Contaminated With Dinoseb and Toxaphene	P020 P123	Dismantling Process Equipment and Lines	1,497,550 lb (1990)	CECOS International Livingstone, LA LAD000618298 (1,485,000 lbs)	Landfill
				LAD069452340 (12,750 lbs)	
			539,880 lb (1991)	Chemical Waste Management Carlyss, LA LAD000777201 (83,860 lbs)	
				Texas Ecologists, Inc. Robstown, TX TXD069452340 (456,020 lbs)	
Hexachlorocyclo-pentadine	D002	Old Laboratory Chemical	50 lb (1991)	Laidlaw Environmental Services (TS), Inc. Greenbrier, TN TND000645770	Liquid Incineration
Old Laboratory Chemicals	N/A	*Old Laboratory* Chemicals	595.5 lb (1991)	CWM Chemical Services Millington, TN TND000772186	Solids Incineration
Arsenic Trioxide	P012	Old Laboratory Chemical	3.5 lb (1991)	CWM Chemical Services Millington, TN TND000772186	Solids Incineration
Brucine Sulfate	P018	Old Laboratory Chemical	1.0 lb (1991)	CWM Chemical Services Millington, TN TND000772186	Solids Incineration

TABLE 5-1 HAZARDOUS WASTE GENERATION AND DISPOSAL INFORMATION					
WASTE DESCRIPTION	EPA I.D. NUMBER	WASTE-GENERATING PROCESS	QUANTITY	TREATMENT/ DISPOSAL FACILITY	TREATMENT/ DISPOSAL METHOD
DNBP (Dinoseb) Samples	P020	Old Laboratory Samples	68.0 lb (1991)	CWM Chemical Services Millington, TN TND000772186	Solids Incineration
Cyanide Compounds	P030	Old Laboratory Chemicals	9.5 lb (1991)	CWM Chemical Services Millington, TN TND000772186	Solids Incineration
Dinitro-o-cresol	P047	Old Laboratory Chemical	13.0 lb (1991)	CWM Chemical Services Millington, TN TND000772186	Solids Incineration
Endrin	P051	Old Laboratory Chemical	0.1 lb (1991)	CWM Chemical Services Millington, TN TND000772186	Solids Incineration
Methyl Parathion	P071	Old Laboratory Chemical	8.0 lb (1991)	CWM Chemical Services Millington, TN TND000772186	Solids Incineration
Nitrosodiethanol	P082	Old Laboratory Chemical	0.1 lb (1991)	CWM Chemical Services Millington, TN TND000772186	Solids Incineration
Parathion	P089	Old Laboratory Chemical	2.0 lb (1991)	CWM Chemical Services Millington, TN TND000772186	Solids Incineration
Potassium Cyanide	P098	Old Laboratory Chemical	1.3 lb (1991)	CWM Chemical Services Millington, TN TND000772186	Solids Incineration
Sodium Azide	P105	Old Laboratory Chemical	0.3 lb (1991)	CWM Chemical Services Millington, TN TND000772186	Solids Incineration
Sodium Cyanide	P106	Old Laboratory Chemical	1.0 lb (1991)	CWM Chemical Services Millington, TN TND000772186	Solids Incineration

wastewaters and north plant wastewaters (if the north plant wastewaters cannot be direct discharged due to out-of-specification pH). The contents of the surface impoundment are pumped to the activated carbon treatment units. The two sumps, the surface impoundment, and the Calgon carbon columns are inspected weekly for operation, leaks, level control, silt accumulation, and freeboard (See checklist in Appendix S). **Note:** The waters within the surface impoundments appear to meet the definition of hazardous waste due to the presence of pesticide residuals; however, the Mississippi Department of Natural Resources has ruled that this material is subject to the *de minimis* rule, and is thus exempt from RCRA requirements. This ruling is discussed in detail in the Regulatory History section below.

North plant acidic and alkaline wastewaters are treated by elementary neutralization within enclosed tanks. These wastewaters are therefore exempt from hazardous waste permitting. The wastewaters are neutralized through the addition of sulfuric acid or caustic, depending upon the incoming pH.

All other hazardous waste generated are transported offsite for disposal. The disposal facilities and treatment/disposal technologies employed by these facilities are shown Table 5-1. Plant management is well versed in the DOT requirements for hazardous waste labeling, marking, placarding, and packaging. Copies of sample hazardous waste manifests are provided in Appendix U.

Regulatory History

The following narrative is paraphrased from the *Cedar Chemical RCRA Facility Assessment Interim Final Report* prepared by Woodward-Clyde Consultants for the U.S. EPA in March, 1992. The RFA report is included in its entirety in Appendix V of this report.

In November, 1980, Vertac Chemical Corporation filed a Part A hazardous waste management facility permit application with the Mississippi Department of Natural Resources. The Notification of Hazardous Waste Activity has been submitted in June, 1980. In the Part A application, Vertac registered as a treatment, storage, and disposal facility producing potassium nitrate and the pesticides dinoseb and toxaphene. The south plant surface impoundment was classified as a hazardous waste unit. A revised Part A was submitted in September, 1981, and a Part B application (along with a third revised Part A) was submitted in August, 1983. The Part B application was found to be deficient in regard to closure, post-closure, and groundwater monitoring plans. A revised Part B application was therefore submitted in June, 1985. The application was also found to be deficient in the areas of closure and post-closure plans, contingency plans, and groundwater monitoring plans. In July, 1986, Cedar Chemical was formally denied a RCRA permit.

After the permit rejection, the facility was required to submit a closure/post-closure plan for the dinoseb drum storage area or to amend the plan in the Part B application to meet the requirements of the Mississippi Hazardous Waste Management Regulations. Also, due to numerous alleged RCRA and NPDES violations regarding releases from the surface impoundment and in the inactive landfill during 1980 through 1985, a hearing was scheduled before the Mississippi Commission on Natural Resources (MCNR) for July 22, 1986, regarding a compliance schedule and penalties for past violations. Cedar Chemical responded by filing a Motion to Dismiss based on the theory that the south plant surface impoundment should not be regulated under RCRA and should not be subject to the Mississippi Commission on Natural Resources. Following the hearing with MCNR, a Commission Order was issued detailing the penalties and compliance schedule which the facility would be required to follow should they fail to demonstrate by September 16, 1986 that the surface impoundment should not be subject to RCRA requirements.

Cedar Chemical's position regarding the declassification of the surface impoundment was based on the *de minimis* exclusion from the mixture rule in 40 CFR 261.3. This exclusion includes any losses from normal manufacturing operations of the product. The MDNR argued that the releases from the Returned Product and Drum Storage Areas, which were not part of the manufacturing operations, could possibly be conveyed to the impoundment. Cedar Chemical contested by demonstrating that the drainage system from these areas had been segregated from the system entering the impoundment. Also, all losses of dinoseb from production since 1985 had been collected and either recycled or disposed of offsite. These points were debated at the September 16, 1986, meeting, but no decision was issued.

The MDNR and the U.S. EPA requested that the hearing be expanded to determine if the surface impoundment was regulated under RCRA due to the containment of past wastes associated with the production of toxaphene. These wastes included untreated process wastewater from the toxaphene production (K098) and the associated wastewater sludge (K041). Cedar Chemical contested this theory by stating that their toxaphene process was different from the one used by EPA to set the standards and that the wastewater generated in the process was therefore different. On December 17, 1986, the Commission ruled in favor of Cedar Chemical. The toxaphene losses were declared exempt by the *de minimis* exclusion in 40 CFR 261.3. Dinoseb losses are also exempt under the same exclusion.

EPA continues to maintain that the Drum Storage Area, which was found to be mismanaged during numerous inspections, is not a less than 90-day storage unit which, therefore, cannot operate without either interim status or a RCRA permit. Several commission orders along with monetary fines were issued to Cedar Chemical during 1987 and 1988 regarding mismanagement of the drum storage area.

Subsequently, the EPA has performed a RCRA Facility Assessment (RFA) of the Cedar Chemical facility. A concurrent complaint regarding the drum storage area was filed by EPA with the United States District Court for the Southern District of Mississippi. A consent decree has been prepared and agreed to by both parties; final approval by the Federal Court is anticipated to occur in the near future. The draft consent decree, which is included in Appendix W of this report, requires preparation and implementation of clean closure activities for the former container management area as well as any other areas specified by EPA. In addition, the implied decree requires a RCRA Facility Investigation (RFI) to be performed for the entire facility, along with a subsequent Corrective Measures Study (CMS), a Corrective Measures Implementation (CMI) Program Plan, and the implementation of approved work plans. Plant personnel also believe that there may be further legal action taken by the MSDNR regarding RCRA and contamination issues.

In response to the U.S. EPA draft RFA report, Cedar Chemical has prepared the subsequent draft RFI Preliminary Report and Workplan. However, it is anticipated that these documents will be revised substantially prior to approval. The RFA (See Appendix V) identifies 34 Solid Waste Management Units (SWMUs); the majority of these SWMUs are recommended for further investigation.

5.4 Waste Minimization

The Mississippi Comprehensive Multimedia Waste Minimization Act of 1990 required the preparation and implementation of an overall Waste Minimization Plan by January 1, 1991. Cedar Chemical has prepared a plan which meets the requirements of the act; a copy of the Waste Minimization Plan is included in Appendix X of this report.

The goals and intentions of the Mississippi program are:

- When feasible, the generation of waste should be reduced or eliminated at the source.
- When feasible, waste that is generated should be recycled.
- Waste that cannot be reduced or recycled should be treated safely.
- Disposal is to be the last resort.
- Reduction or minimization of the generation or toxicity of waste generated by at least 25 percent by January 1, 1996.

The waste minimization plan in Appendix X describes the scope and objectives of waste minimization activities at the Cedar Chemical Company, Vicksburg facility. It identifies the process wastes generated at the facility as well as the material losses. These are listed below:

Process Wastes and Material Losses

Losses from nitric acid production include:

- Unreacted ammonia discharged through the stack.
- Fugitive losses of ammonia into the atmosphere.
- Fugitive and point losses of nitric acid into the atmosphere.
- NO_x emissions.
- HNO_3 losses into process wastewaters.
- Ammonium nitrate losses present in process wastewater.

There are multiple sources of material and product loss in the potassium nitrate plant:

Losses in Material Handling
- Spillage of raw material and product from belt conveyors.
- Airborne dust loss of raw material and product from belt conveyors.
- Spillage of raw material and product from material elevators.
- Airborne dust loss from elevators.
- Spillage and airborne losses of product from front end loaders.
- Spillage/airborne dust lost of caustic potash.
- Product dust and microprill loss from counterflow air vent in prilling tower.
- Loss of prilled material due to recoil of product from shaker conveyor at base of prilling tower.
- Loss of product from screw conveyors due to spillage, clogging/backups, and dust emissions.
- Dust lost of materials from screw conveyors.
- Spillage/airborne dust lost during bagging operations.
- Spillage/airborne dust lost during bulk loading operations.

Losses in General Housekeeping
- Water washing deposits excessive quantity of spilled materials into plant drainage system.
- Loss of refrigerant from loose fittings and valves.
- Loss of liquid materials from loose fittings and valves.
- Possible loss of materials during rupture of tanks and units without secondary containment.

Losses in Production Processes
- Emissions of NO_x from process vents.
- Agglomeration of product in dryer due to uneven neutralization and drying, requiring frequent washouts to process drains.

- Loss of materials and product to process scrubbers.
- Moisture absorption causing loss of product due to caking.
- Excessive heat loss from melt tank.
- Excessive water use for cooling.
- Scrubbing of residual chlorine from returning tank cars causes excessive losses.

Implementation of this plan will result not only in compliance with the waste minimization regulations, it should also be effective at air emissions reduction, improved stormwater discharge levels, and vastly reduced product losses with the associated increases in revenues.

6.0 RELEASES AND CONTAMINATION

6.1 Releases

Numerous releases are known to have occurred at the Cedar Chemical facility; two are considered major. In addition, many minor spills have occured over the life of the facility. The major events are described below. Much of this information was obtained from the *draft RCRA Facility Investigation Preliminary Report* prepared by Woodward Clyde Consultants in April, 1991. Pertinent sections are included in Appendix Y.

Surface Impoundment Breach

In February 1983, the surface impoundment dikes breached during a flood, discharging approximately 700,000 gallons of water contaminated with 4 ppm dinoseb into the adjacent Stouts Bayou. No apparent injury to fish, wildlife, or the environment was indicated in the subsequent chemical analysis and associated inspections. Emergency action was taken to repair the breach. After the heavy rains were over, the impoundment was reconfigured to include a dewatering mechanism and increasing the height of the dike. Also, the contaminated sediments were removed from the impoundment and landfilled in the onsite landfill which was designed per RCRA guidelines.

Methyl Parathion Fire and Explosion

A major ground spill occurred on March 7, 1978, when an explosion and fire occurred in the methyl parathion production area. Approximately 300 to 400 55-gallon drums of methyl parathion exploded. The products of combustion for methyl parathion are carbon monoxide, carbon dioxide, nitrogen oxides, phosphorus, and sulfur. The production area and an adjacent warehouse for paranitrosodium phenolate burned. The products of combustion for paranitrosodium phenolate are nitrogen oxides, carbon dioxide, carbon monoxide, and sodium hydroxide. The majority of the surface runoff, which included phenols and suspended solids, was discharged into the surface impoundment. Soil and water samples were later obtained and analyzed; the analyses indicated that any methyl parathion which migrated into surrounding areas had degraded in the environment.

Additional Known Releases

Many additional releases have occurred during the life of the Cedar Chemical facility. Some of the more significant are:

- On June 6, 1976, a dinoseb spill in Hennessey's Bayou resulted in a fish kill and a \$5,000 penalty from the Mississippi Department of Natural Resources.

- The first NPDES effluent limitations became effective in January of 1977. Only discharges to the Mississippi River were authorized in this permit. However, a cross-connection between a storm sewer line and the wastewater sewer in the potassium nitrate process area resulted in unpermitted discharges to Stout's Bayou during heavy rains. This condition existed until the summer of 1977. During heavy rains, approximately 10 percent of the process wastewater flowed into the storm sewer and then into Stout's Bayou.

- Frequent violations of NPDES discharge limitations occurred in the late 1970s and early 1980s. Many of these were due to heavy rainfall which overwhelmed the collection system capacity; on three occasions in 1985, the surface impoundment was bypassed to avoid breaching the dike. Also, the two explosions and fires in the south plant resulted in unpermitted discharges. The water used to fight the fires overflowed the containment dikes in the manufacturing areas.

- Several areas of stained soil present in the south plant area indicate that many releases to ground surfaces have occurred in the past. This is especially evident in areas where dinoseb was produced or handled; these areas display a noticeable yellow staining of the soil. No records of these surface discharges exist. Cedar Chemical considers these spills to have been the result of *de minimis* losses from plant operation, which include minor spills, leaks from pipes and valves, minor leaks from process equipment, and leaks from well-maintained pump packings and seals during normal manufacturing operations.

- In the late 1970s, an acetone tank located within the atrazine plant exploded. Acetone was used as a process solvent. There is no known contamination associated with this accident.

- During attempts to move a tank containing dinoseb, the tank ruptured and discharged the entire contents on the ground surfaces within the south plant. The cleanup efforts undertaken are unknown.

- Several isolated releases of vapors from individual processing areas have occurred over the operational history of the plant. Many occurred during the 1970s and generated numerous complaints. In 1977-78, efforts at compliance with air emissions regulatory requirements drastically reduced the quantity of such losses. Significant releases included a release of phosphorus trichloride from the methyl parathion unit in 1974 due to operator error, a release of chlorine which damaged local vegetation in 1980, and a reportable release of nitrogen dioxide due to equipment malfunction in February, 1992.

- The liners of the three ponds are known to be leaking. A leachate collection system is being used to pump leachate from beneath the liners and to reinject the water into the ponds, thus preventing the spread of contamination in the underlying soils and groundwater.

The RFA report and the RFI Preliminary Report located in Appendices V and Y contain more detailed description of past spills and releases at this facility.

6.2 Contamination

Considerable evidence exists that much of the Cedar Chemical south plant is heavily contaminated with pesticides and related materials. Contamination has been detected in concrete pads, surficial soils, subsurface soils, and groundwater. The EPA RCRA Facility Assessment report identifies 34 Solid Waste Management Units (SWMUs) which have and may be continuing to release contaminants into the environment. Table 6-1 lists the SWMUs previously identified. The RFA recommends that a RCRA Facility Investigation be performed of the SWMUs which are identified with an asterisk in Table 6-1.

There are also four areas of concern identified by EPA as requiring further investigation:

- North Plant Fish Pond.
- Drum Storage Area.
- South Plant Neutralization Tanks.
- Chemical Crypt (Septic Tank).

The draft RFI Preliminary Report and Work Plan have been prepared by Cedar Chemical. After further revision, these documents will be implemented upon approval of the consent decree by the U.S. District Court. The Preliminary Report describes the current status of each SWMU. Rather than duplicate this information in this report, the relevant sections of the Preliminary Report are included in Appendix Y.

Several areas in the south plan display the yellow surface staining indicative of dinoseb contamination. These are primarily in former dinoseb production areas, along the railroad lines, inside and around the former dinoseb packaging and storage building, and in other non-related areas where it appears that spills or dumping has occurred. Also, there are areas of the landfill area in which dinoseb wastes were deposited which are displaying the same yellow

TABLE 6-1 SOLID WASTE MANAGEMENT UNITS (SWMUs)	
SWMU NUMBER	SWMU NAME
SOUTH PLANT	
1	Drum Storage Areas *
2	Inactive Landfill *
3	South Plant Surface Impoundments *
4	Carbon Adsorption System *
5	South Plant Drainage System *
6	*South Plant Hill Tank*
7	Former Dinoseb Production Area *
8	Dinoseb Off-Loading Area *
9	Dinoseb Drumming Area and Drains *
10	Dinoseb Stock Storage Area
11	Former MSMA Production Area *
12	Former MSMA Salt Unloading Area *
13	South Plant Drainage Ditches *
14	Former Toxaphene Production Area *
15	Former Methyl Parathion Production Area *
16	Former Atrazine Production Area *
17	Returned Product Storage Area *
18	Former Blue Tank *
19	Scrap Metal Dumpster
20	Railroad Car Unloading Station*
21	Vacuum Truck
NORTH PLANT	
22	North Plant Neutralization System *
23	Inactive North Plant Surface Impoundment *
24	North Plant Containment System
25	Wastewater Pipes *
26	C-10 Scrubber *
27	Cooler Scrubber
28	End Product Scrubber
29	Oil Collection Unit *
30	Waste Oil SAA *
31	No. 6 Fuel Oil Area *
32	C-15 Scrubber
33	North Plant Drainage Ditches *
BOTH PLANTS	
34	Junkyard and Waste Piles *

staining. Dynoseb tends to migrate to the surface when the ground is saturated with water, so that even when surface areas are remediated, deeper contamination will eventually migrate to the surface and contaminate the clean fill soils. The phenomenon has appeared in several areas where past remedial activities have occurred.

Seventeen monitoring wells are located on the subject property. Table 6-2 lists the contaminants which were found in each well in the latest sampling event (December, 1991). The analytical reports for this sampling event are shown in Appendix Z of this report. Additional sampling results can be seen in the RFI Preliminary Report in Appendix Y.

The full extent of surface and subsurface contamination at this facility is currently unknown. This information will be determined per the terms of the consent decree and under the oversight of the EPA and MSDNR. Based upon present information, it appears likely that extensive remedial action may be required over much of the south plant. Care should be taken to ensure compliance with consent decree orders and schedules to prevent further regulatory action.

TABLE 6-2 GROUNDWATER CONTAMINATION	
MONITORING WELL NUMBER	**CONTAMINANTS**
1	No Sampling Performed
1A	Dinoseb (67 ppb) Chloroform (4 ppb) Trichloroethene (9 ppb)
2	Total 1,2-Dichloroethylene (11 ppb)
3	None Detected
4	None Detected
5	Arsenic (0.008 ppm)
6	Toxaphene (18.8 ppb)
7	Arsenic (0.009 ppm)
8	Arsenic (0.049 ppm) Vinyl Chloride (5 ppb)
9	None Detected
10	Arsenic (0.006 ppm)
11	Trichloroethene (16 ppb)
12	Arsenic (0.011 ppm)
13	Arsenic (0.003 ppm)
14	None Detected
15	No Sampling Performed
16	Arsenic (0.005 ppm)